Looming Maladaptive Style as a Specific Moderator of Risk Factors for Anxiety

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Introduction

Anxiety disorders are the most common mental illness in the United States with a lifetime prevalence rate of 29% (Kessler et al., 2005). Identifying predictors related to the onset and course of anxiety is important to developing better intervention programs. Prior research has focused primarily on two factors in the etiology and maintenance of anxiety, namely the tendency to view threatening events as likely and the experience of threatening events. For instance, anxiety is associated with the tendency to both view ambiguous situations as threatening as well as overestimate the probability of threatening events (Berenbaum, Thompson, & Pomerantz, 2007; Butler & Matthews, 1983; Butler & Matthews, 1987). Evidence of a causal relationship has also been shown with experimental manipulations of this tendency leading to changes in anxiety (Wilson, MacLeod, Mathews, & Rutherford, 2006). Life events have also been implicated in the development and course of anxiety across a number of studies (e.g., Beasley, Thompson, & Davidson, 2003; Herrington, Matheny, Curlette, McCarthy, & Penick, 2005). Among the broader class of negative life events, threatening events (as opposed to events associated with health or loss) have been found to be particularly predictive of the course of anxiety (Sandin, Chorot, Santed, & Valiente, 2004). Thus, both the tendency to predict and actually experience threatening events have shown promise as important determinants of anxiety.

Riskind (1997) has proposed that one important, though previously neglected factor in understanding anxiety is an individual's tendency to view threatening events as rapidly intensifying and approaching. Riskind and colleagues refer to this tendency as a looming maladaptive style (LMS). Research confirms that LMS is concurrently associated with severity

of anxiety. For example, Riskind, Kelley, Harman, Moore, and Gaines (1992) showed that among undergraduates with spider phobia, the severity of their fear was related to their tendency to see a still photograph of a spider as quickly moving towards them. Perhaps more importantly, studies have also demonstrated that LMS predicts subsequent change in symptoms of anxiety. In an undergraduate sample selected for low anxiety symptoms, LMS was found to predict change in symptoms of anxiety over a one week period (Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000).

One of the more important claims of the looming vulnerability model is that, unlike many risk factors which increase risk for both symptoms of anxiety and depression, LMS is hypothesized to be more specifically important to the course of anxiety symptoms. This claim has received initial support from several studies (e.g., Reardon & Williams, 2006; Riskind et al., 2000). For instance, Riskind and Williams (2005) found that individuals diagnosed with Generalized Anxiety Disorder (GAD) based on a structured clinical interview scored higher on a measure of LMS compared to individuals diagnosed with Major Depression and those without any diagnosis. These findings are consistent with the view that LMS may be an important cognitive vulnerability specifically for anxiety, but not for depression.

According to the looming vulnerability model, the predictive utility of traditional risk factors (i.e., the tendency to view threatening events as likely or experience threatening events) is limited because they involve static estimates. To better capture the dynamic nature of cognitive vulnerabilities to anxiety that are related to threatening stimuli, considering individual differences in LMS is important. To my knowledge, no study has yet examined whether the relationship between seeing threatening events as likely or experiencing threatening events and the course of anxiety symptoms is particularly strong for people with a high LMS. Therefore,

the primary purpose of this study was to examine LMS as a moderator of risk for anxiety. A moderator is a variable that affects the relationship between a predictor variable (e.g., predictive tendencies or experiences of threatening events) and a criterion variable (e.g., change in symptoms of anxiety) (Baron & Kenny, 1986). Moderators are represented as interactions in regression equations. Significant interactions indicate that the combination of two risk factors predicts substantially more risk than either risk factor alone.

For the current study, I investigated three hypotheses. First, I projected that both predictive tendencies and experiences of threatening events would predict a poorer course of anxiety symptoms over one month. Second, my primary hypothesis was that these two relationships would be moderated by LMS. I expected two interactions in predicting change in anxiety: first, an interaction of predictive tendencies for threatening events and LMS, and second, an interaction of experiencing threatening events and LMS. I hypothesized that both predictive tendencies and experiences with threatening events would predict a worse course of anxiety symptoms for people who had a greater LMS. Third, I also explored whether these predictive relationships (if identified) were specific to change in anxiety symptoms as compared to change in depressive symptoms. Thus, I was interested in examining whether the interactions of interest predicted unique change in anxiety not accounted for by concurrent change in depression.

Methods

Participants

Undergraduate students in introductory psychology courses at the Ohio State University were recruited to participate in this study in return for course credit. A total of 72 participants completed the study. The sample was largely female (62.5%; $n = 45$) and Caucasian (86.1%, $n =$

62). The average age was 18.7 years old (*SD* = 1.04).

Measures

Looming Maladaptive Style Questionnaire. The LMSQ (Riskind et al., 1992) is a self-report measure that assesses the tendency to perceive potentially threatening situations as rapidly rising in risk or intensifying in danger. Participants read six brief vignettes describing potentially stressful situations (e.g., "You speak in front of a large audience of strangers") and are asked to imagine themselves in the situation as if it were currently happening to them at the moment. Participants answer three questions for each vignette using a 5-point Likert scale (i.e., "In this scene are the chances of your having difficulty decreasing or expanding with each moment? Is the level of threat in the encounter staying fairly constant or is it growing rapidly with each passing moment? How much do you visualize your problem as in the act of becoming progressively worse?"). Evidence of both reliability and validity of this measure has been reported (Reardon & Williams, 2006; Riskind & Williams, 1999; Riskind et al., 2000). This measure was completed by participants at the initial assessment to determine the level of LMS.

Predictions and Assessments of Life Events. To assess participants' predictive tendencies and experiences of threatening life events over a one month period, I utilized a list of 10 threat-relevant events (see Appendix) based on previously used measures of daily stress and negative life events in college students (e.g., Crandall, Preisler, & Aussprung, 1992). Each event was rated as being: (1) objectively defined; (2) moderately to severely threatening; and (3) likely to have a base rate greater than 10% in a one month period in a college sample. For each event, participants were asked to predict the probability (0 – 100) of each event occurring to them over the next month. Weekly reports of event occurrence were collected online for the first three weeks, and a final weekly report was collected during a follow-up visit, which was

approximately 30 days from the initial session.

Two scores were calculated for each participant on the basis of their predictions and experiences of threatening life events. First, an index (called predictive tendencies) was calculated by averaging participants' probability estimates for the 10 threat-relevant events. Predictive tendencies scores could range from 0 to 100%, with higher scores reflecting greater estimates of the probability that threatening events would occur. Second, an index (called outcomes) was calculated by averaging participants' reports of event occurrence (coded 1 if event occurred, coded 0 if event did not occur) across the four weeks. Thus, outcomes scores could range from 0 to 1, with higher scores reflecting a greater percentage of threatening events being experienced.

Anxiety Symptoms. A composite score for anxiety symptoms was calculated by combining scores on the *Beck Anxiety Inventory* (BAI; Beck & Steer, 1990) and the *Hamilton Rating Scale for Anxiety* (HRSA; Hamilton, 1959). A composite score was used to reduce the familywise error rate and because such scores may possess enhanced reliability and validity (Epstein, 1979, 1980; Rushton, Brainerd, & Pressley, 1983). The BAI is a 21-item self-report instrument commonly used to assess anxiety symptoms. The HRSA is a 14-item interviewer-rated measure regularly used to assess the severity of anxiety symptoms. Both measures have demonstrated reliability and validity in both clinical and nonclinical samples (Beck, Epstein, Brown, & Steer, 1988; Borden, Peterson, & Jackson, 1991; Maier, Buller, Philipp, & Heuser, 1988). Intraclass correlation coefficients (ICCs) were calculated for the HRSA using a one-way random effects model (see McGraw & Wong, 1996) and found to be acceptable (ICC = .80). Participants completed both measures of anxiety at the initial assessment (time 1) as well as at the one month follow-up (time 5).

Depressive Symptoms. A composite score for depressive symptoms was calculated by combining scores on the *Beck Depression Inventory – 2nd Edition* (*BDI-II*; Beck, Steer, & Brown, 1996) and the *Hamilton Rating Scale for Depression* (HRSD; Hamilton, 1960; Williams, 1988). The BDI-II is a 21-item self-report measure of depressive symptoms. The 17-item version of the HRSD is an interviewer administered measure of depressive symptom severity. The reliability and validity of the BDI-II (Beck et al., 1996) and the HRSD (Hamilton, 1960; Knesevich, Biggs, Clayton, & Ziegler, 1977; O'Hara & Rehm, 1983) have been well established. The ICC for the reliability of ratings on the HRSD were also acceptable (ICC = .76). Participants completed both measures of depression at time 1 and time 5.

Results

Preliminary Analyses

Average scores on measures of anxiety and depressive symptoms at time 1 and time 5 are provided in Table 1. Participants reported a range of anxiety and depressive symptoms. The independence of the predictors of interest was examined using correlational analyses. LMSQ scores were moderately correlated with both predictive tendencies ($r = .30$, $p = .01$) and outcomes ($r = .32$, $p = .006$). Predictive tendencies and outcomes were also moderately positively correlated with each other ($r = .43$, $p < .001$). Thus, the predictors of interest were each positively correlated with one another but also appeared sufficiently independent.

Predictive Tendencies and Anxiety

The average probability estimate for threatening events was .42 ($SD = .20$). Using a regression model, predictive tendencies assessed at time 1 was a significant predictor of anxiety at time 5 after controlling for anxiety at time 1 ($\beta = .22$, $p = .01$). Furthermore, the interaction of predictive tendencies and LMSQ assessed at time 1 was also a significant predictor of

anxiety at time 5 after controlling for anxiety at time 1 (β = .24, p = .004). This interaction accounted for significantly more variance than merely considering each of these predictors independently (ΔR^2 = .05). As displayed in Figure 1, predictive tendencies for threatening events were strongly related to change in anxiety among participants with high scores on the LMSQ (+1 SD; b = 2.09, SE = .54, p = .0002). However, the strength of the relationship between predictive tendencies and change in anxiety was less evident among participants with low scores on the LMSQ (-1 SD; b = -.11, SE = .41, p = .78).

Additional analyses were conducted to explore the utility of this model for distinctively predicting change in anxiety. When change in depressive symptoms (calculated as a residualized change score) was entered in the model described above, the interaction of predictive tendencies and LMSQ scores remained significant in predicting change in anxiety (β = .12, p = .03). I conducted a parallel regression analysis in which change in depressive symptoms was included as the outcome variable and residualized change in anxiety symptoms was included as a covariate. In this model, the interaction between predictive tendencies and LMSQ scores was not significant (β = -.03, p = .55). Thus, these results suggest that the interaction of predictive tendencies and LMSQ scores appears specific for predicting change in symptoms of anxiety (as compared to symptoms of depression).

Outcomes and Anxiety

On average, participants reported that 44% of threatening events occurred to them over the one-month period (SD = .23). Similar to predictive tendencies, outcomes was also related to anxiety at time 5 after controlling for anxiety at time 1 (β = .26, p < .01). More threatening events occurring were related to a worse course of anxiety symptoms over the one month follow-up period. Furthermore, the interaction between outcomes and LMSQ scores in predicting

change in anxiety symptoms was also significant (β = .19, ΔR^2 = .04, p = .02). As shown in Figure 2, for individuals scoring low on the LMSQ (-1 SD), the experience of threatening events was only weakly related to subsequent change in anxiety symptoms (b = -.16, SE = .37, p = .66). However, among individuals who scored high on the LMSQ (+1 SD), threatening events were more strongly related to subsequent change in anxiety, with individuals reporting high levels of threatening events and high LMSQ scores showing the greatest increases in anxiety symptoms (b = 1.42, SE = .36, p = .0002).

Similar to predictive tendencies, the specificity of the interaction of outcomes and LMSQ scores in predicting change in anxiety symptoms was also examined by including change in depressive symptoms as a covariate (measured as a residualized change scores) in the regression model described above. The relationship between LMSQ scores and outcomes in predicting change in anxiety symptoms remained significant even after covarying for change in depressive symptoms (β = .11, p = .03). A model in which the interaction of interest was examined as a predictor of change in depressive symptoms covarying residualized change in anxiety was also examined. In this model, the interaction of outcomes and LMSQ scores was not significant (β = -.05, p = .34), suggesting that this interaction is specific to predicting change in anxiety symptoms.

Discussion

Consistent with my primary hypotheses, both predictive tendencies for and experiences of threatening outcomes independently interacted with LMS to predict change in symptoms of anxiety. First, for participants with higher levels of LMS, participants' estimates of the likelihood of threatening events were especially predictive of a worse course of anxiety symptoms. Second, LMS also moderated the relationship between threatening life events and

change in symptoms of anxiety. Threatening life events were most predictive of the course of anxiety for people with a high LMS. Both of these effects exhibited specificity for explaining change in symptoms of anxiety (as compared to depression) over one month. The effects continued to predict change in symptoms of anxiety even after accounting for change in symptoms of depression. Moreover, similar interactions of predictive tendencies with LMS and experiences of threatening events with LMS were not predictive of change in depressive symptoms. Thus, these findings are consistent with the idea that LMS is more specifically relevant as a cognitive vulnerability for anxiety than depression (Riskind, 1997).

These findings add to a growing body of empirical work suggesting that the looming vulnerability model offers significant advances over traditional cognitive models in understanding the etiology and course of anxiety (Riskind & Williams, 2006). As cognitive models of anxiety continue to be refined, the development of models which simultaneously take multiple, distinct information processing biases and personal learning histories into account will be increasingly important. My results provide an important step in this direction by showing that not only do LMS, predictive tendencies for threatening events, and experiences of threatening events each predict change in anxiety, but these variables interact in important ways that allow for a more precise characterization of risk for change in anxiety symptoms. I focused on change in anxiety symptoms over one-month, but future research may examine other outcome measures and follow-up periods (e.g., the onset of anxiety disorders over several years).

The evidence for an interaction of LMS and experiences of threatening events in predicting change in anxiety symptoms is consistent with the LMS model (Riskind, 1997; Riskind & Williams, 2006). However, this finding is still open to multiple interpretations. One possibility is that LMS predisposes people to have more severe reactions to threatening events

(i.e., they experience more anxiety in response to stressors than their low LMS counterparts). A second possibility is that LMS predisposes people to have a deficiency in their ability to return to baseline levels of anxiety in the wake of threatening events. Either or both of these possibilities may account for the effects obtained. More precisely establishing the mechanisms which account for the effects obtained in this study would be a useful goal of a future study.

I acknowledge three important limitations to this study. First, this sample was composed of undergraduates who were non-treatment seeking and primarily Caucasian. Replication of these findings in a more diverse community and clinical samples is desirable. Second, these findings may be limited by the specific events used to assess predictive tendencies and outcomes. Though the events studied were selected partly on the basis of being considered threatening, I did not assess individual differences among participants in how threatening each event would be for them. In addition, 6 of the 10 events studied may be most relevant to anxiety related to social situations. Thus, I have not established how well these findings would generalize to non-social threatening events. Finally, change in anxiety symptoms was limited to continuous symptom change over a one-month period. Whether these findings would apply to predicting the onset, recurrence or rate of recovery from anxiety disorders is not yet clear. *Conclusion*

The current findings are consistent with the idea of LMS as a distinct cognitive vulnerability, which helps explain in what context negative predictions and the experience of threatening events are most likely to predict anxiety over time. Specifically, when people exhibit a high LMS, the relationships between more traditional risk factors and symptoms of anxiety are particularly strong. Future research could productively examine the role LMS and other cognitive vulnerabilities play in the course of specific anxiety disorders.

References

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182.

Beasley, M., Thompson, T., & Davidson, J. (2003). Resilience in responses to life stress: The effects of coping style and cognitive hardiness. *Personality and Individual Differences*, *34*, 77-95.

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*, 893-897.

Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Brown, B. K. (1996). *Beck Depression Inventory manual* (2nd ed.). San Antonio, TX: Psychological Corporation.

Berenbaum, H., Thompson, R. J., & Pomerantz, E. M. (2007). The relation between worrying and concerns: The importance of perceived probability and cost. *Behaviour Research and Therapy*, *45*, 301-311.

Borden, J. W., Peterson, D. R., & Jackson, E. A. (1991). The Beck Anxiety Inventory in nonclinical samples: Initial psychometric properties. *Journal of Psychopathology and Behavioral Assessment, 13,* 345-356.

Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research & Therapy*, *5*, 51-62.

Butler, G., & Mathews, A. (1987). Anticipatory anxiety and risk prediction. *Cognitive Therapy and Research*, *11*, 551-565.

Crandall, C. S., Preisler, J. J., & Aussprung, J. (1992). Measuring life event stress in the lives of college students: The Undergraduate Stress Questionnaire (USQ). *Journal of Behavioral Medicine, 15,* 627-662.

Epstein, S. (1979). The stability of behavior: I. On predicting most of the people much of the time. *Journal of Personality and Social Psychology*, *37*, 1097-1126.

Epstein, S. (1980). The stability of behavior: II. Implications for psychological research. *American Psychologist*, *35*, 790-806.

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, *32*, 50-55.

Hamilton, M. (1960). A rating scale for depression. *Journal of Neurological Neurosurgical Psychiatry, 23*, 56-62.

Herrington, A. N., Matheny, K. B., Curlette, W. L., McCarthy, C. J., & Penick, J. (2005). Lifestyles, Coping Resources, and Negative Life Events as predictors of Emotional Distress in University Women. *Journal of Individual Psychology*, *61*, 343-364.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, Severity, and Comorbidity of 12-Month DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617-627.

Knesevich, J. W., Biggs, J. T., Clayton, P. J., & Ziegler, V. E. (1977). Validity of the Hamilton Rating Scale for Depression. *British Journal of Psychiatry, 131*, 49-52.

Maier, W., Buller, R., Philipp, M., & Heuser, I. (1988). The Hamilton Anxiety Scale: Reliability, validity and sensitivity to change in anxiety and depressive disorders. *Journal of Affective*

Disorders, *14*, 61-68.
McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods, 1,* 30-46.
O'Hara, M. W., & Rehm, L. P. (1983). Hamilton Rating Scale for Depression: Reliability and validity of judgments of novice raters. *Journal of Consulting and Clinical Psychology, 51,* 318-319.
Reardon, J. M., & Williams, N. L. (2006). The specificity of cognitive vulnerabilities to emotional disorders: Anxiety sensitivity, looming vulnerability, and explanatory style. *Journal of Anxiety Disorders, 21,* 625-643.
Riskind, J. H. (1997). Looming vulnerability to threat: A cognitive paradigm for anxiety. *Behaviour Research and Therapy*, *35*, 685-702.
Riskind, J. H., Kelley, K., Harman, W., Moore, R., & Gaines, H. S. (1992). The loomingness of danger: Does it discriminate focal phobia and general anxiety from depression? *Cognitive Therapy and Research*, *16*, 603-622.
Riskind, J. H., & Williams, N. L. (1999). Specific cognitive content of anxiety and catastrophizing: Looming vulnerability and the looming maladaptive style. *Journal of Cognitive Psychotherapy*, *13*, 41-54.
Riskind, J. H., & Williams, N. L. (2005). The looming cognitive style and generalized anxiety disorder: Distinctive danger schemas and cognitive phenomenology. *Cognitive Therapy and Research, 29,* 7-27.
Riskind, J. H., & Williams, N. L. (2006). A unique vulnerability common to all anxiety disorders: The looming maladaptive style. In L. B. Alloy, J. H. Riskind (Eds.), *Cognitive vulnerability to emotional disorders* (p.175-206). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
Riskind, J. H., Williams, N. L., Gessner, T. L., Chrosniak, L. D., & Cortina, J. M. (2000). The looming maladaptive style: Anxiety, danger, and schematic processing. *Journal of Personality and Social Psychology*, *79*, 837-852.
Rushton, J.P., Brainerd, C.J., & Pressley, M. (1983). Behavioral development and construct validity: The principle of aggregation. *Psychological Bulletin*, *94*, 18-38.
Sandin, B., Chorot, P., Santed, M. A., & Valiente, R. M. (2004). Differences in negative life events between patients with anxiety disorders, depression and hypochondriasis. *Anxiety, Stress & Coping: An International Journal*, *17*, 37-47.
Williams, J. B. (1988). A structured interview guide for the Hamilton Depression Rating Scale. *Archives of General Psychiatry*, *45*, 742-747.
Wilson, E. J., MacLeod, C., Mathews, A., & Rutherford, E. M. (2006). The causal role of interpretive bias in anxiety reactivity. *Journal of Abnormal Psychology*, *115*, 103-111.

Appendix

Average Predicted Probability Estimates and Event Occurrence for 10 Threatening Events.

Threatening Event	Predictions M	Base Rate M
1. Give a speech	.31	.12
2. Fail a test	.38	.51
3. Confront a feared situation (e.g., heights, insects, blood)	.32	.28
4. Be criticized by a close friend or family member	.57	.63
5. Be left out of a group activity	.53	.55
6. Miss an important class	.41	.61
7. Make a phone call to someone you don't know	.29	.41
8. Embarrass yourself in a public setting	.53	.41
9. Have an extended conversation with a stranger	.46	.52
10. Get lost in an unfamiliar environment	.41	.27

Note. The "Predictions" column lists the average probability participants provided for each event. The "Base Rate" column lists the frequency with which participants reported each event occurred.

Table 1

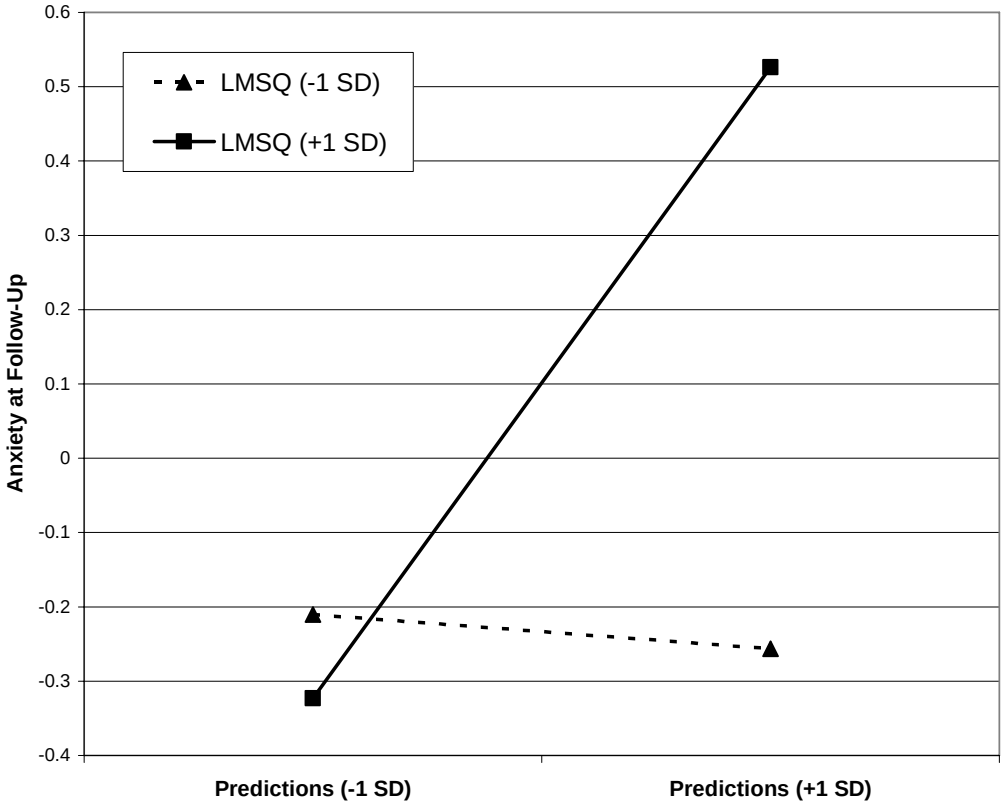
Means and standard deviations on measures of anxiety and depression at initial assessment and one month follow-up.

	Initial			Follow-up		
	M	SD	% elevated	M	SD	% elevated
Beck Anxiety Inventory	8.36	8.91	29	6.64	8.42	18
Hamilton Rating Scale for Anxiety	7.88	6.91	10	7.92	7.35	9
Beck Depression Inventory	12.57	11.63	44	10.68	11.05	25
Hamilton Rating Scale for Depression	7.39	5.58	13	8.15	6.15	16

Note. Elevated scores were ≥ 10 for the Beck Anxiety Inventory, ≥ 18 for the Hamilton Rating Scale for Anxiety, ≥ 13 for the Beck Depression Inventory, and ≥ 14 for the Hamilton Rating Scale for Depression.

Figure 1

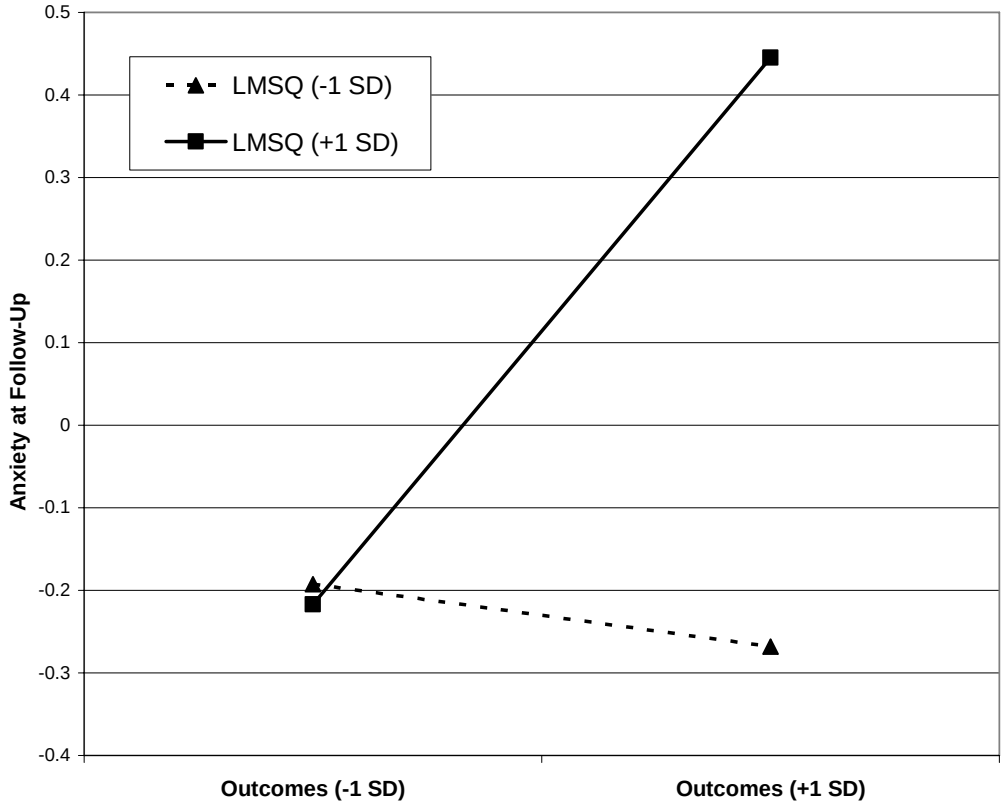
Interaction of predictive tendencies and LMSQ in predicting anxiety at one month follow-up controlling for initial anxiety.



Note. *LMSQ* = Looming Maladaptive Style Questionnaire. *Anxiety* = composite score for anxiety symptom severity (combining standardized scores on the Beck Anxiety Inventory and Hamilton Rating Scale for Anxiety). *Predictions* = predictive tendencies (i.e., average probability estimates for 10 threat-relevant events occurring over the next month).

Figure 2

Interaction of outcomes and LMSQ in predicting anxiety at one month follow-up controlling for initial anxiety.



Note. *LMSQ* = Looming Maladaptive Style Questionnaire. *Anxiety* = composite score for anxiety symptom severity (combining standardized scores on the Beck Anxiety Inventory and Hamilton Rating Scale for Anxiety). *Outcomes* = average occurrence of 10 threatening events over a one month period.